I CLAIM:

1. A programmable conductor memory cell for an integrated circuit, comprising:

a memory cell body comprising a glass electrolyte with metal ions disposed therein, the cell body having a cathode surface in contact with a cathode and an anode surface in contact with an anode and filling a cell body via in a first insulating layer, thereby defining a sidewall where the memory cell body and the first insulating layer make contact;

a second insulating layer over the first insulating layer; and

the anode at least partially filling an anode via through the second insulating layer, the anode contacting only a central portion of the anode surface of the memory cell body, the central portion spaced inwardly from the sidewall of the memory cell body.

2. The programmable conductor memory cell of Claim 1, wherein the anode via is smaller in width than the memory cell body, and a sidewall edge of the memory cell body where the sidewall meets the anode surface is covered by the second insulating layer.

3. The programmable conductor memory cell of Claim 1, wherein the anode via is about the same width as the memory cell body, and the anode via is lined with a spacer that covers a sidewall edge of the memory cell body where the sidewall meets the anode surface.

4. The programmable conductor memory cell of Claim 3, wherein the spacer comprises an insulating material.

5. The programmable conductor memory cell of Claim 3, wherein the spacer has a thickness extending into the anode via between about 5 nm and 30 nm.

6. The programmable conductor memory cell of Claim 3, wherein the spacer comprises silicon nitride.

7. The programmable conductor memory cell of Claim 1, wherein the cell body comprises a plurality of layers.

8. The programmable conductor memory cell of Claim 1, wherein the anode via is filled with metal.

9. The programmable conductor memory cell of Claim 8, wherein the metal in the anode via is contiguous with a metal layer over the second insulating layer.

10. The programmable conductor memory cell of Claim 1, wherein the cathode comprises tungsten.

11. The programmable conductor memory cell of Claim 1, wherein the memory cell body comprises a chalcogenide glass electrolyte material.

12. The programmable conductor memory cell of Claim 11, wherein the metal ions are selected from the group consisting of silver, copper, zinc and combinations thereof.

13. The programmable conductor memory cell of Claim 11, wherein the anode comprises silver.

14. The programmable conductor memory cell of Claim 13, wherein the glass electrolyte material comprises silver-germanium-selenium.

15. The programmable conductor memory cell of Claim 1, wherein a distance between the cathode surface and the anode surface of the memory cell body is about 25 nm to 100 nm.

16. The programmable conductor memory cell of Claim 1, wherein a width of the memory cell body via is between about 100 nm and 500 nm.

17. The programmable conductor memory cell of Claim 1, wherein a width of the memory cell body via is between about 200 nm and 300 nm.

18. The programmable conductor memory cell of Claim 1, wherein the first insulating layer comprises silicon nitride.

19. The programmable conductor memory cell of Claim 18, wherein the first insulating layer has a thickness between about 10 nm and 200 nm.

20. The programmable conductor memory cell of Claim 18, wherein the first insulating layer has a thickness between about 25 nm and 150 nm.

21. The programmable conductor memory cell of Claim 1, wherein the second insulating layer comprises silicon nitride.

22. The programmable conductor memory cell of Claim 20, wherein the second insulating layer has a thickness between about 50 nm and 200 nm.

23. The programmable conductor memory cell of Claim 22, wherein the second insulating layer has a thickness between about 80 nm and 150 nm.

24. The programmable conductor memory cell of Claim 1, wherein the anode via has a width no greater than the width of the cell body via.

25. A programmable conductor random access memory cell, comprising:

a silver-germanium-selenium glass electrolyte memory cell body over a cathode and surrounded by a first insulating layer;

a second insulating layer over the first insulating layer, having an anode via therethrough;

a spacer lining the anode via; and

a silver anode making contact to the memory cell body through the anode via lined with the spacer.

26. The programmable conductor memory cell of Claim 25, wherein the spacer comprises an insulating material.

27. The programmable conductor memory cell of Claim 26, wherein the spacer comprises silicon nitride.

28. The programmable conductor memory cell of Claim 27, wherein the thickness of the spacer is between about 5 nm and 30 nm.

29. A programmable conductor random access memory cell comprising insulating spacers along sidewalls of an anode via, the via providing a connecting path between an anode and a memory cell body.

30. A programmable conductor random access memory cell comprising an anode in an anode via through an insulating layer, the anode making contact with only a central portion of a glass electrolyte element.

31. The programmable conductor memory cell of Claim 30, wherein the glass electrolyte comprises silver-germanium-selenium.

32. The programmable conductor memory cell of Claim 30, wherein the anode comprises silver.

33. A method of forming a programmable conductor memory cell comprising:

forming a cathode;

forming a glass electrolyte element in isolation from other active areas and in contact with the cathode;

forming an insulating layer over the glass electrolyte element;

forming an anode via in the insulating layer, thereby exposing a surface of the glass electrolyte element;

depositing a layer of spacer material that conforms to contours of the anode via and the insulating layer;

preferentially etching horizontal portions of the spacer material to expose a central portion of the surface of the glass electrolyte element; and

depositing a layer of conducting material sufficiently thick to fill the anode via and to provide a conducting layer over the insulating layer, thus forming an anode.

34. The method of Claim 33, wherein forming the glass electrolyte element comprises forming a germanium-selenium glass and introducing silver ions into the glass by deposition of a silver layer over the glass and subsequently diffusing silver from the silver layer into the glass.

35. The method of Claim 34, wherein diffusing silver into the glass comprises photodissolution.

36. The method of Claim 33, wherein forming the glass electrolyte element comprises forming a first germanium selenide layer, an intervening metal selenide layer over the first germanium selenide layer, and a second germanium selenide layer over the intervening metal selenide layer.

37. The method of Claim 33, wherein forming the insulating layer comprises depositing silicon nitride.

38. The method of Claim 33, wherein the anode via is formed to a width between about 200 nm and 300 nm.

39. The method of Claim 33, wherein depositing the layer of spacer material comprises depositing a layer of insulating material.

40. The method of Claim 39, wherein depositing the layer of spacer material comprises depositing a layer of silicon nitride.

41. The method of Claim 40, wherein the layer of spacer material is deposited to a thickness between about 5 nm and 30 nm.

42. The method of Claim 33, wherein preferentially etching comprises reactive ion etching.

43. The method of Claim 33, wherein depositing a layer of conducting material comprises depositing silver.

44. A method of forming a programmable conductor memory cell comprising:

forming a cathode;

forming a glass electrolyte element in isolation from other active areas and in contact with the cathode;

forming an insulating layer over the glass electrolyte element;

forming an opening in the insulating layer, to expose a surface of the glass electrolyte element; and

depositing a layer of conducting material into the opening to contact only the central portion of the surface of the glass electrolyte element, thus forming an anode.

45. The method of Claim 44, wherein forming the opening comprises:

etching a via through the insulating layer;

blanket depositing a spacer material layer; and

preferentially etching horizontal portions of the spacer material layer to expose the central portion of the surface of the glass electrolyte element.

46. The method of Claim 45, wherein the spacer material comprises an insulating material.

47. The method of Claim 46, wherein the insulating material is silicon nitride.

48. The method of Claim 44, wherein forming the opening in the insulating layer comprises patterning and etching using a mask with an opening smaller in width than the glass electrolyte element and having the opening arranged concentrically over the glass electrolyte element.